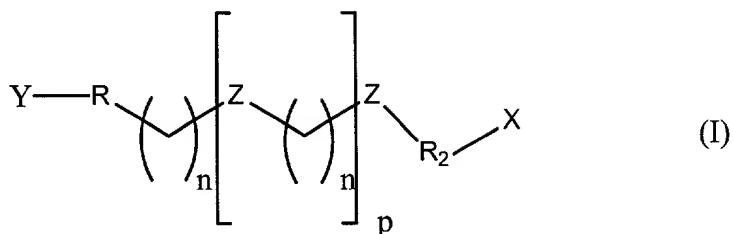


We claim:

1. A nanocrystal linker arm of the following formula:



$$\begin{aligned} n \text{ \& } p &= 0-10 \\ \text{Z} &= \text{O, CH}_2, \text{ or NH} \end{aligned}$$

wherein Y represents the attachment point to the nanocrystal and  
 X represents the attachment point of an organic compound;

R is a bond or is selected from the group consisting of:

SH,

$\text{O}(\text{CH}_2)_n\text{SH}$ ,

$\text{NH}(\text{CH}_2)_n\text{SH}$ ,

$\text{NH}(\text{CH}_2)_n\text{NHSH}$ ,

$\text{S}(\text{CH}_2)_n\text{SH}$ , and

$\text{S}(\text{CH}_2)_n\text{SH}$ ;

n is 1-10; S is the attachment point for the nanocrystal;

$\text{R}_2$  is a bond or selected from the group consisting of

carbonyl,

NH,

SH,

CONH,

5 COO,

S,

C<sub>1-10</sub> alkyl,

carbamate, and

thiocarbamate; and wherein

10 when n and p are 1 or more, the resulting carbon or carbon chain may  
be substituted.

2. The nanocrystal linker arm of claim 1, where Z is O and n and p  
15 are 1-5.

3. The linker arm of claim 1, wherein the attachment point for an  
organic compound is for an biologically active compound.

20 4. The linker arm of claim 1, wherein the attachment point is for  
organic compounds selected from the group consisting of: serotonin or  
serotonin derivatives, cocaine analogues, phenyl tropane analogues,

phenylisopropylamine derivatives, dopamine derivatives, melatonin derivatives, chlormethiazole derivatives, derivatives of RTI-4229-75, and derivatives of GBR 12935.

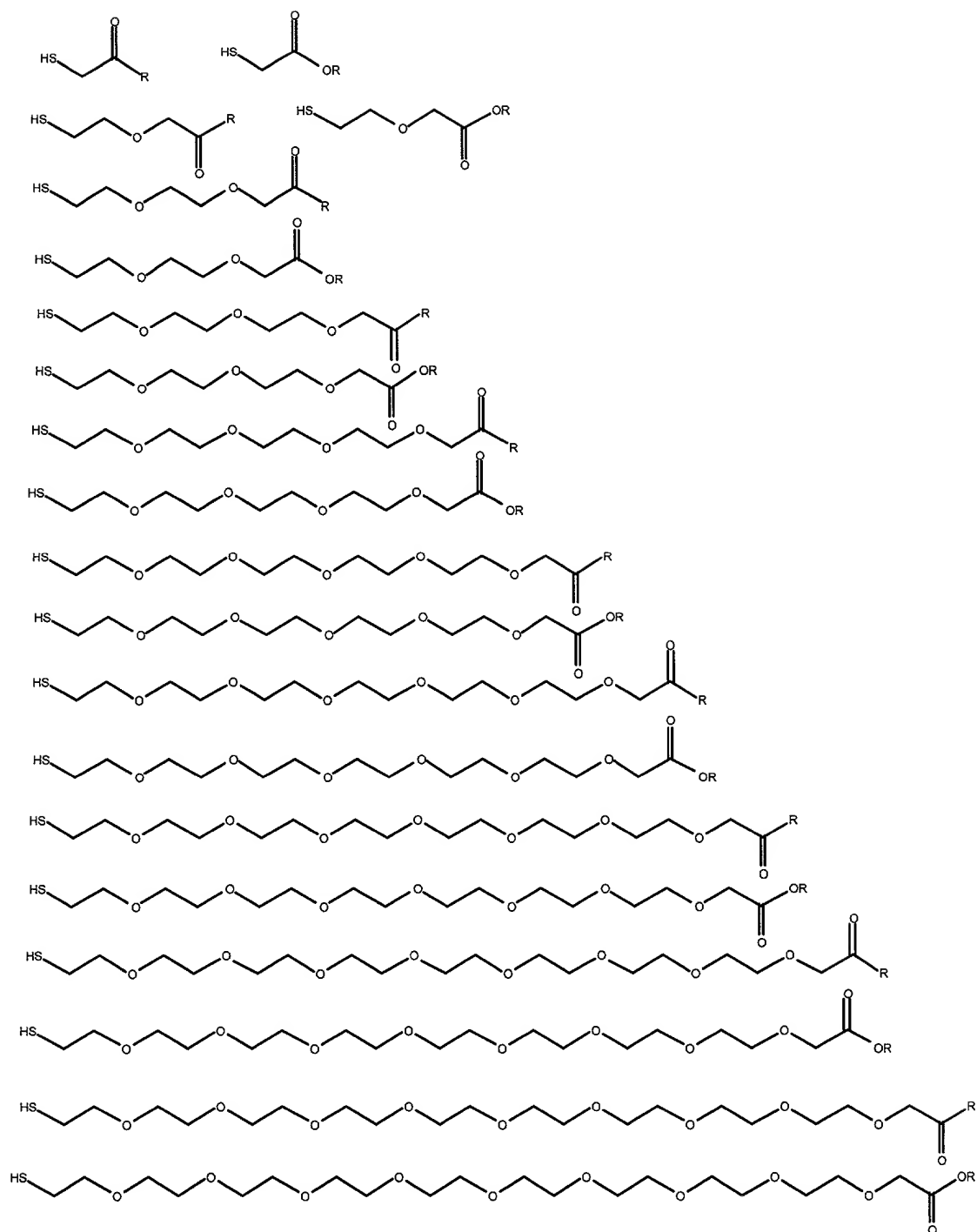
5     5.     The linker arm of claim 1, wherein Y is an attachment point for nanocrystals with cross sections less than about 200 angstroms.

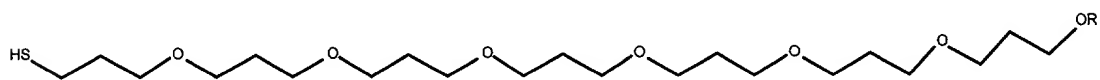
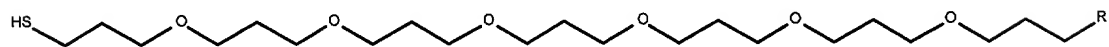
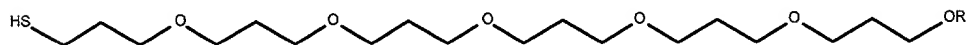
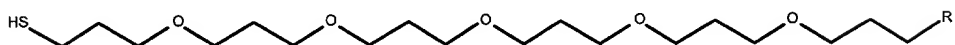
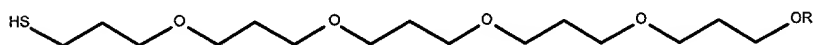
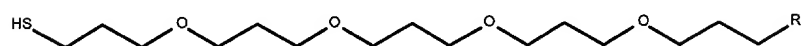
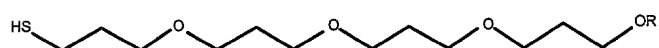
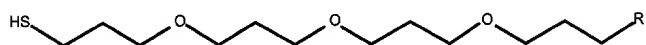
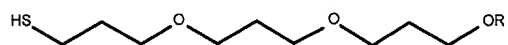
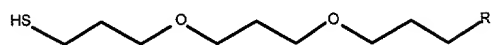
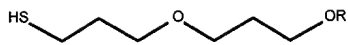
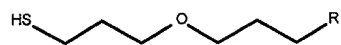
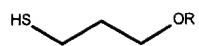
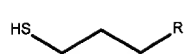
6.     The linker arm of claim 1, wherein Y is an attachment point for nanocrystals selected from the group consisting of CdSe, CdS, PbSe,  
10   PbS, and CdTe nanocrystals.

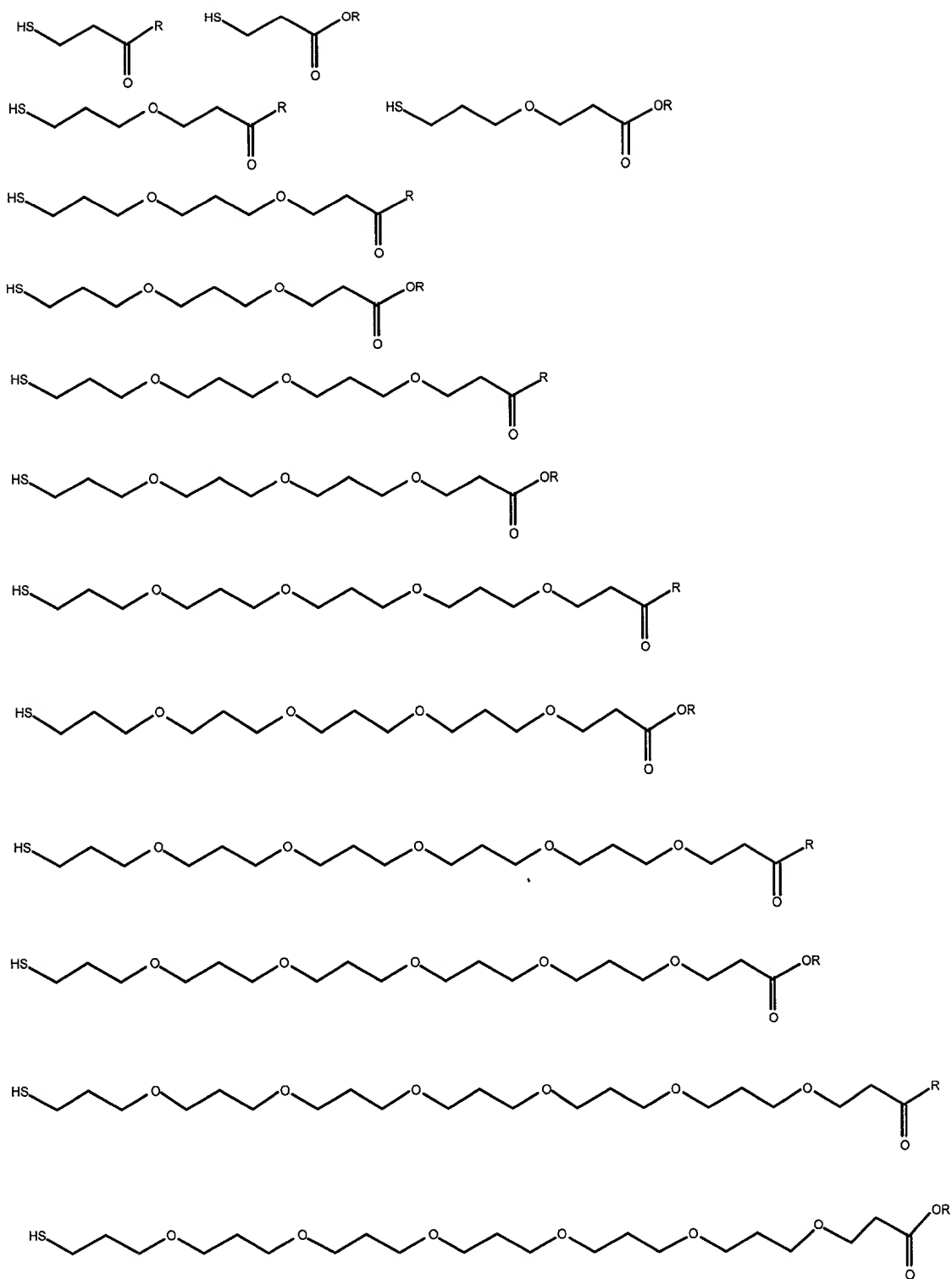
7.     The linker arm of claim 1, wherein the linker arm is selected from the group consisting of:

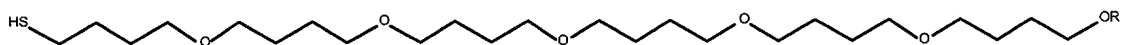
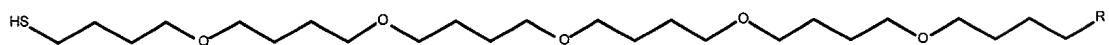
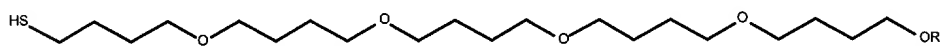
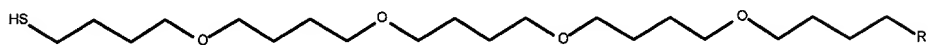
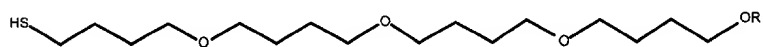
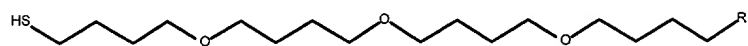
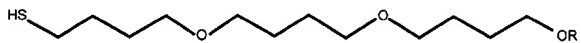
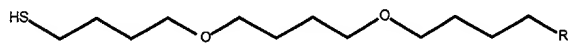
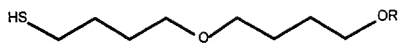
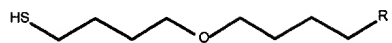
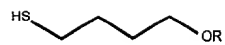
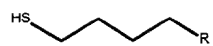
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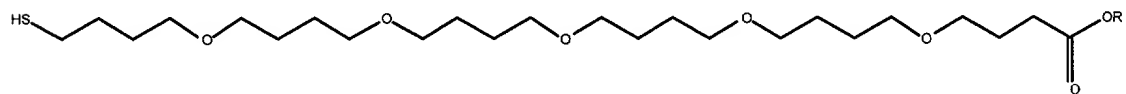
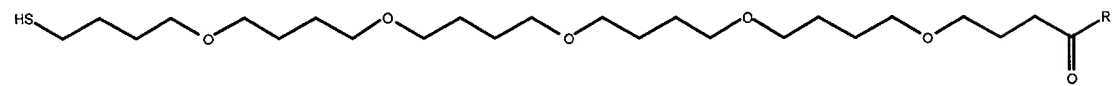
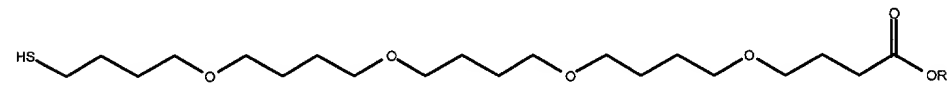
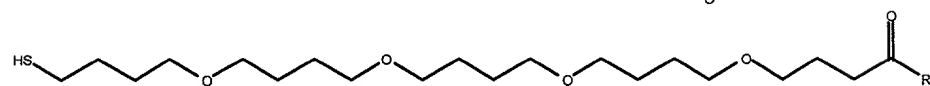
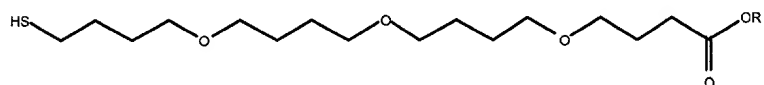
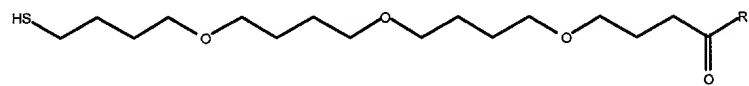
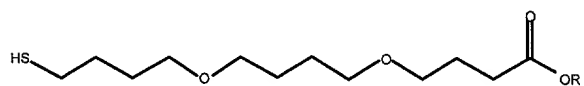
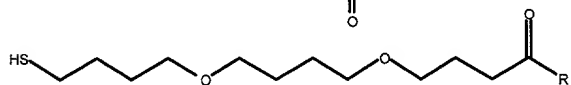
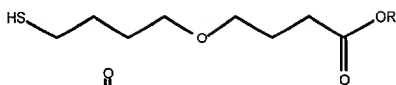
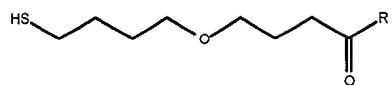
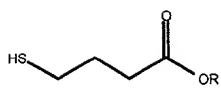
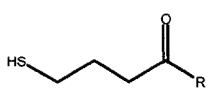




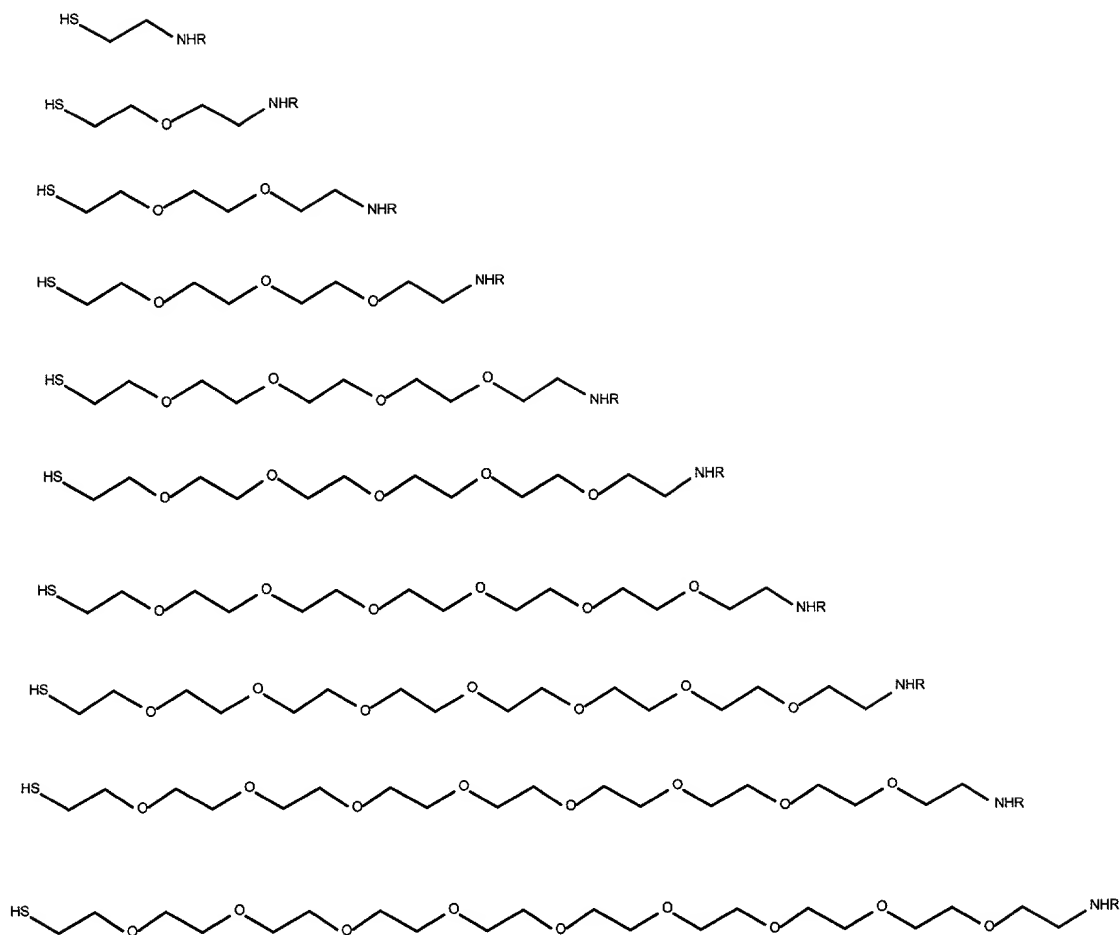








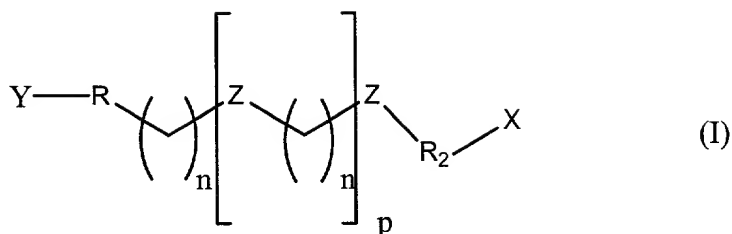
44250 824960



wherein R represents the point of attachment of an organic

5 compound.

8. A nanocrystal compound of the following formula:



$n \text{ \& } p = 0-10$   
 $\text{Z} = \text{O}, \text{CH}_2, \text{ or } \text{NH}$

wherein Y represents the attachment point to the nanocrystal and  
 X represents the attachment point of an organic compound;

R is a bond or is selected from the group consisting of:

SH,

$\text{O}(\text{CH}_2(n)\text{O})_n\text{SH}$ ,

$\text{NH}(\text{CH}_2(n)\text{O})_n\text{SH}$ ,

$\text{NH}(\text{CH}_2(n)\text{NH})\text{SH}$ ,

$\text{S}(\text{CH}_2(n)\text{O})_n\text{SH}$ , and

$\text{S}(\text{CH}_2(n)\text{S})\text{SH}$ ; n is 1-10, with S being attached to the  
 nanocrystal;

R<sub>2</sub> is a bond or selected from the group consisting of

carbonyl,

NH, SH,

CONH,

5 COO,

S,

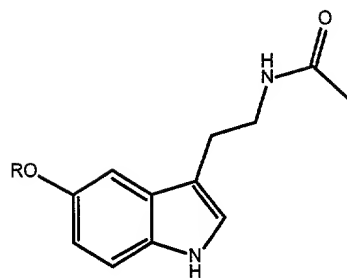
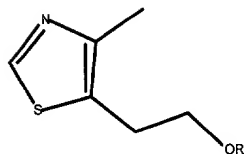
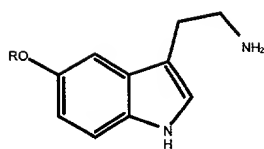
C<sub>1-10</sub> alkyl,

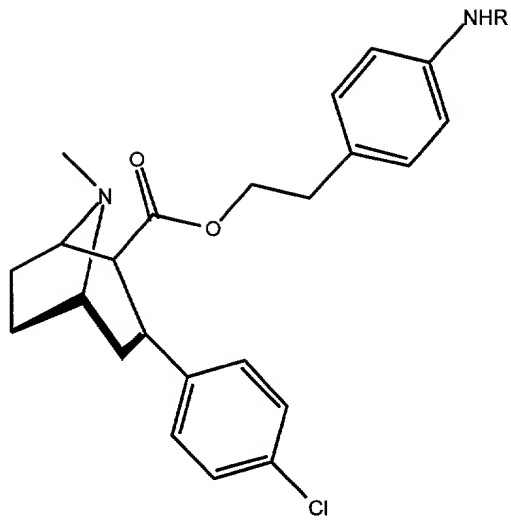
carbamate, and thiocarbamate; and wherein

when n and p are 1 or more, the resulting carbon or carbon chain  
10 may be substituted.

9. The nanocrystal compound of claim 8, wherein the organic  
compound is selected from the group consisting of: serotonin or  
serotonin derivatives, cocaine analogues, phenyl tropane analogues,  
15 phenylisopropylamine derivatives, dopamine derivatives, melatonin  
derivatives, chlormethiazole derivatives, derivatives of RTI-4229-75, and  
derivatives of GBR 12935.

10. The nanocrystal compound of claim 8, wherein the organic  
20 compound is selected from the group consisting of:

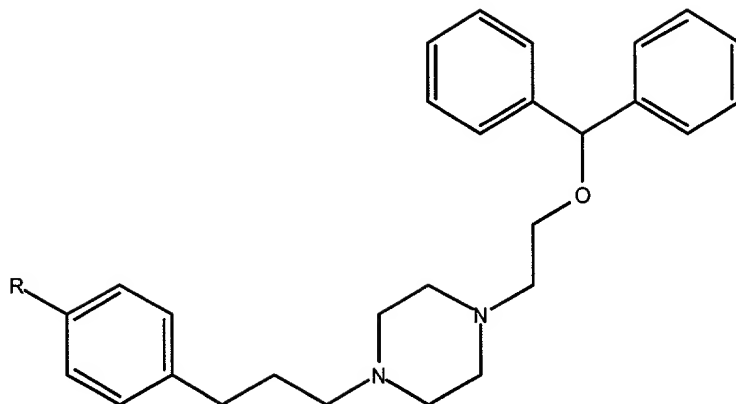




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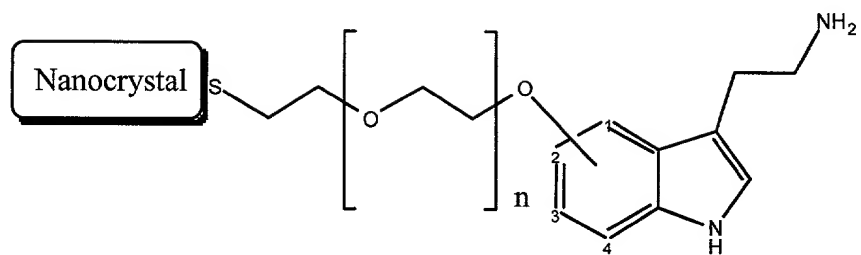
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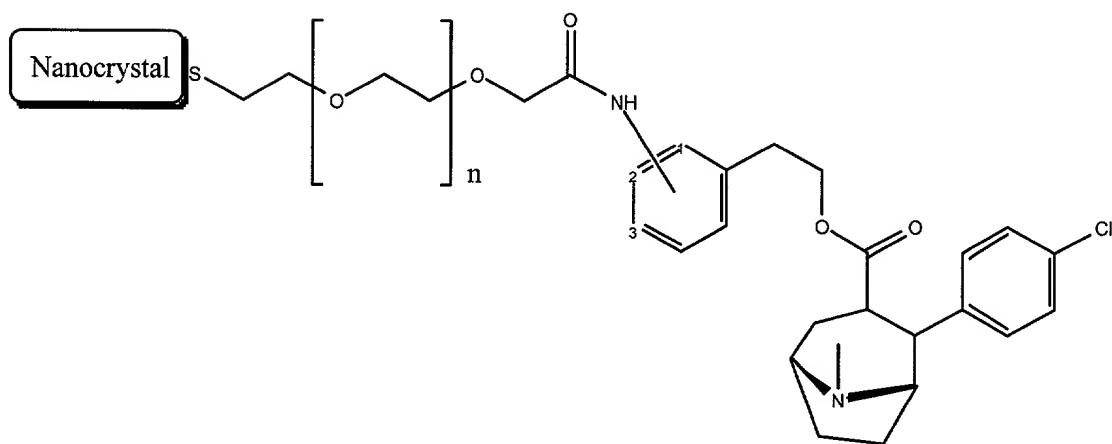


wherein R represents the attachment point to the linker arm.

11. The nanocrystal compound of claim 8, selected from the group consisting of:

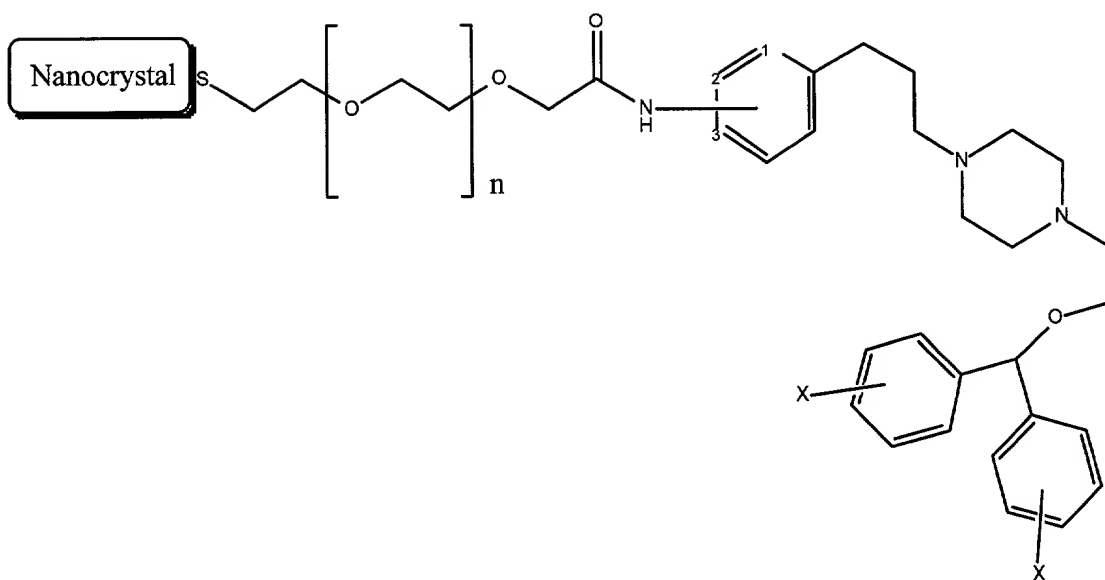


(II)



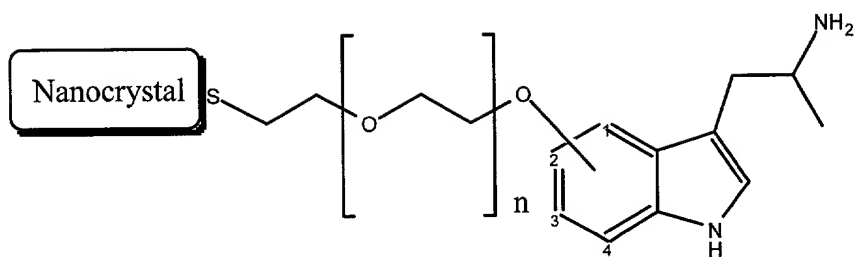
(III)



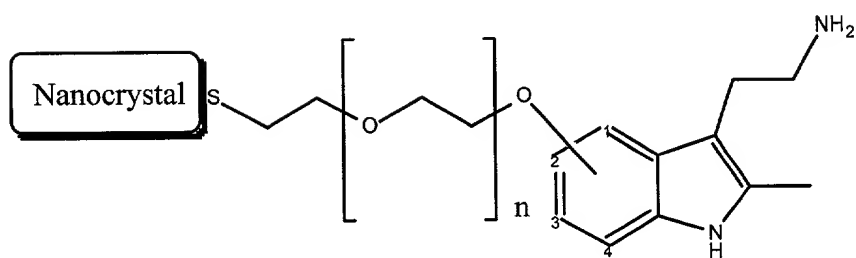


(IV)

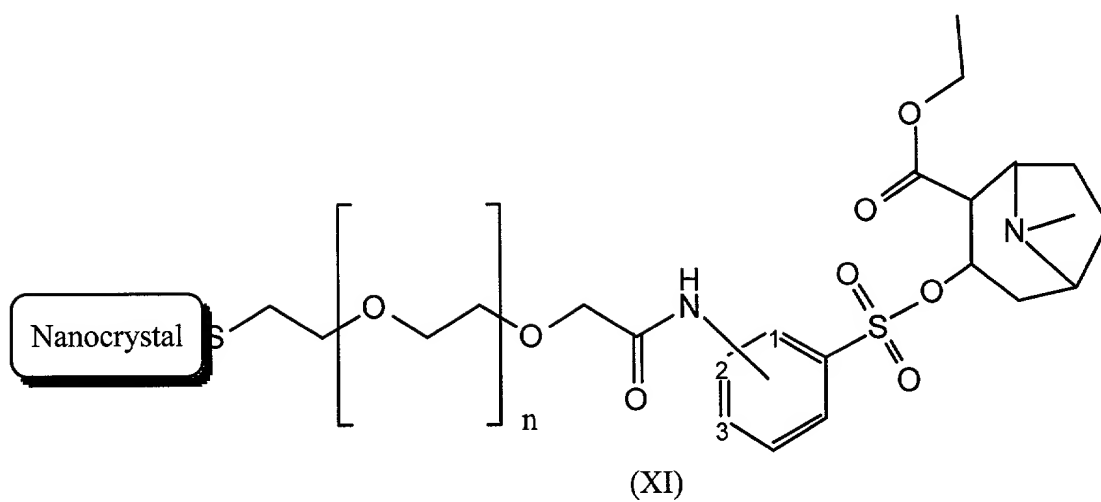


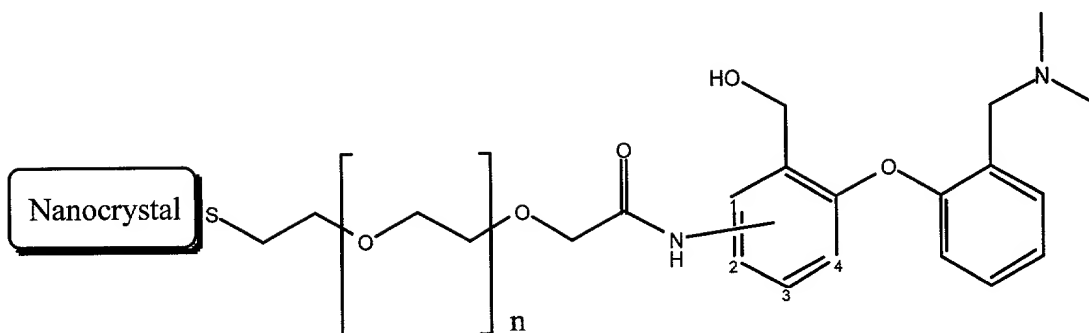


(VII)

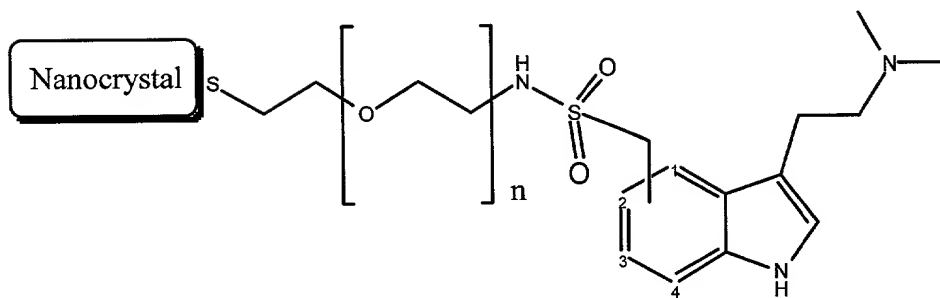


(X)





(XII)



(XIII)

wherein  $n = 0-10$  and  $X$  is H or halogen.

12. The nanocrystal compound of claim 8, wherein the nanocrystal has a cross section of less than about 200 angstroms.

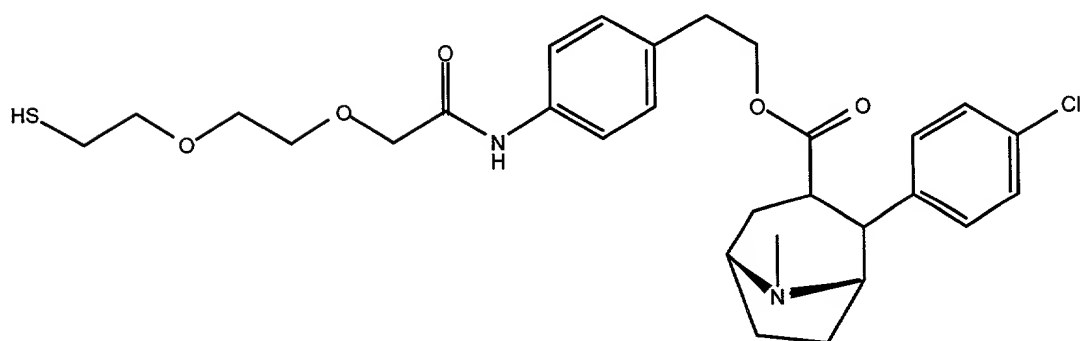
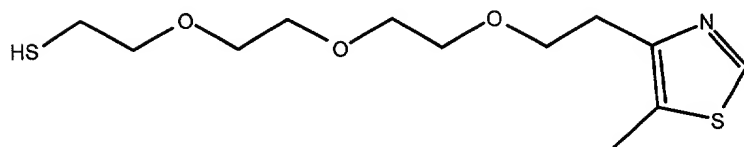
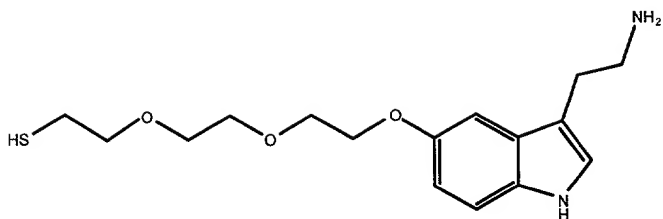
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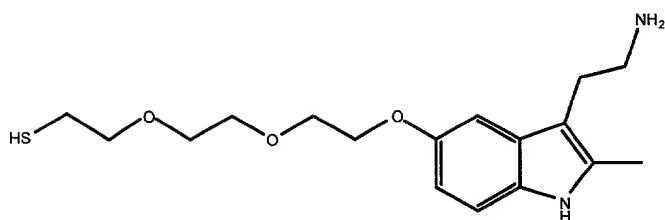
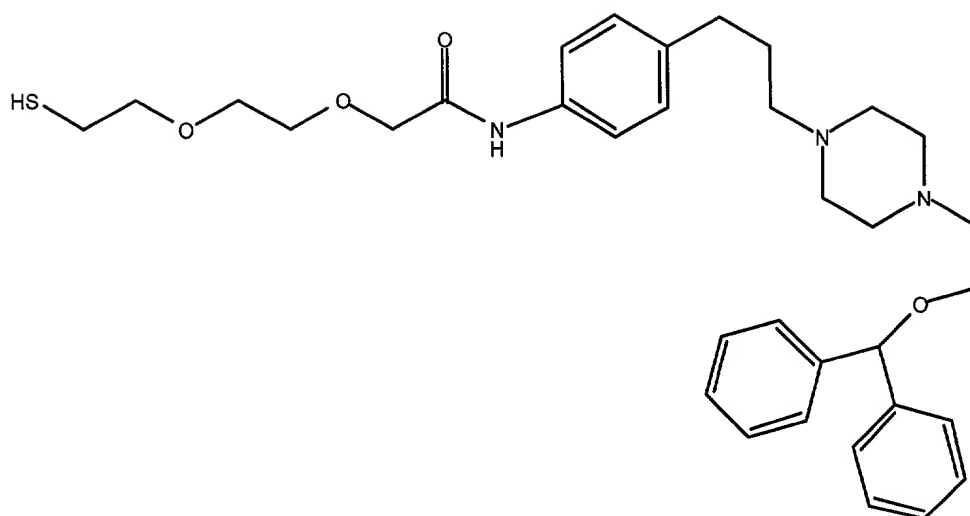
13. The compound of claim 8, wherein the nanocrystal is selected from the group consisting of CdSe, CdS, PbSe, PbS, and CdTe.

14. The compound of claim 8, wherein the organic compound is capable of binding to an affinity molecule, the affinity molecule being a monoclonal antibody, polyclonal antibody, monomeric nucleic acid, oligomeric nucleic acid, protein, polysaccharide, sugar, peptide, drug, ligand.

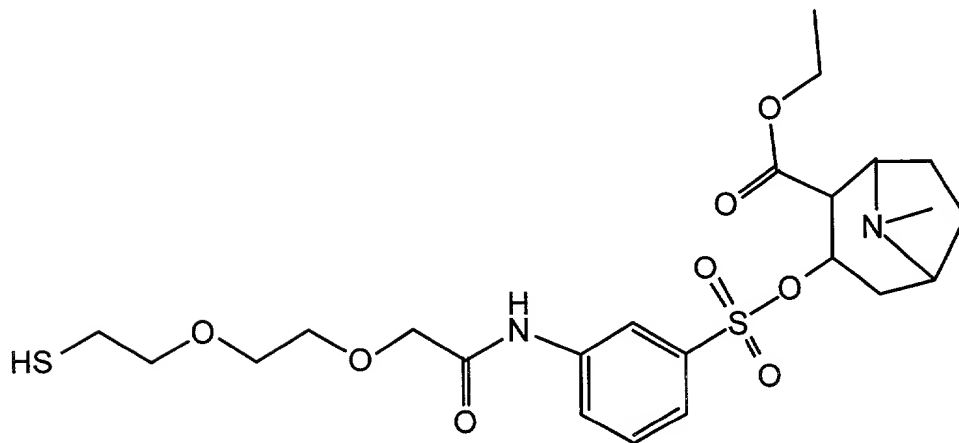
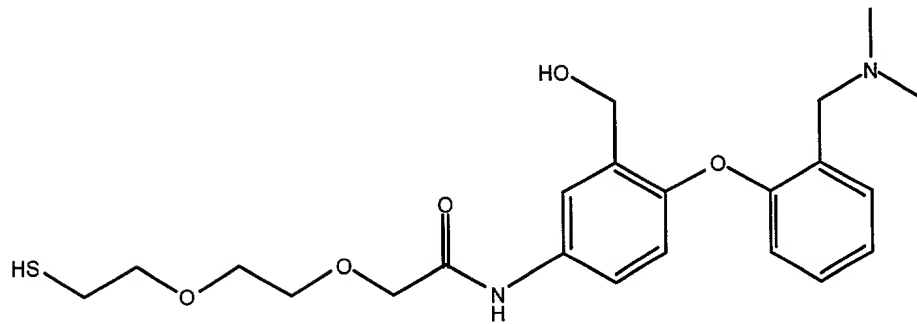
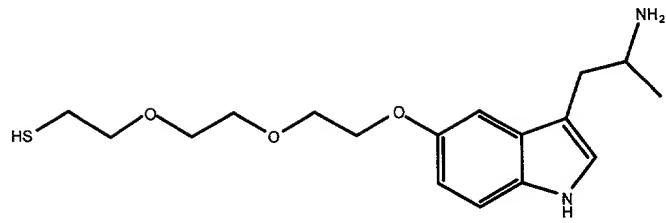
15. The compound of claim 8, wherein the organic compound is serotonin.

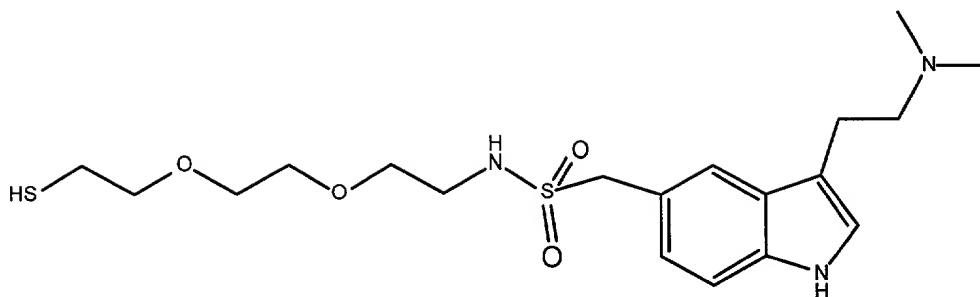
16. The compound of claim 8, selected from the group consisting of:



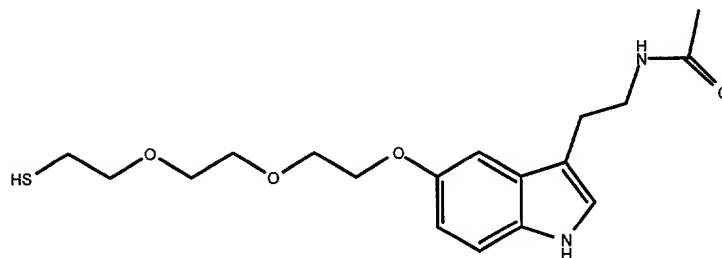








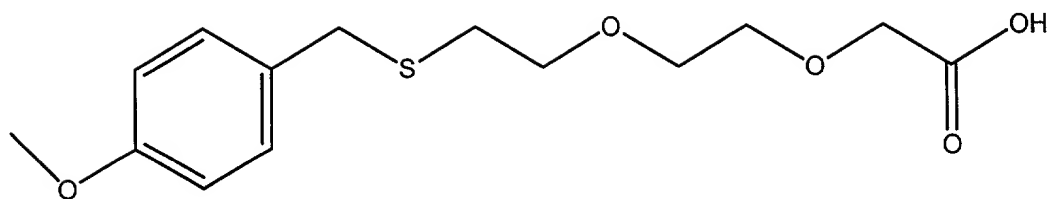
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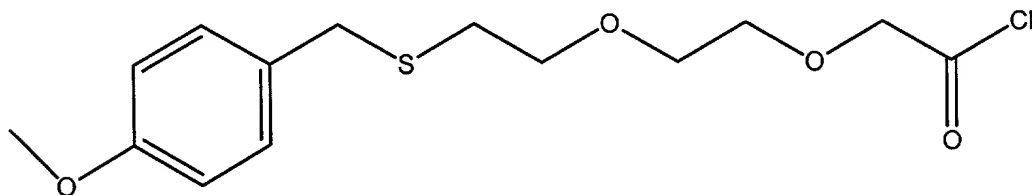
wherein S is the attachment point for the nanocrystal.

17. A compound of the following formula:

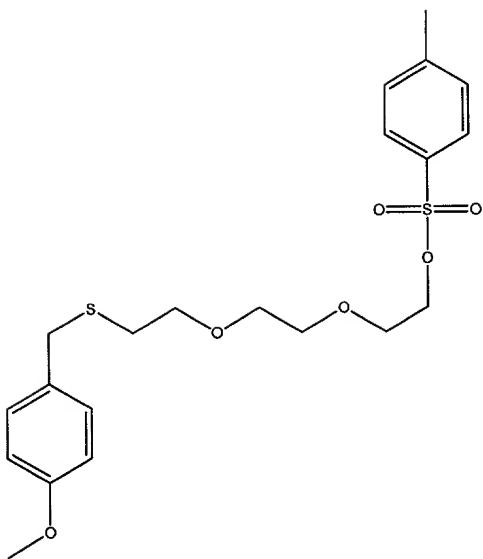


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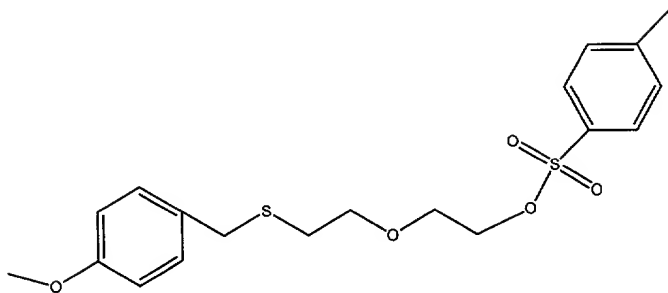
18. A compound of the following formula:



10 19. A compound of the following formula:



20. A compound of the following formula:



5

21. A compound of the following formula:

